

William A. Satariano, MPH PhD
Gerald N. DeLorenze, MA

Both authors are with the Division of Public Health Biology and Epidemiology, School of Public Health, University of California at Berkeley. Dr. Satariano is a Professor of Epidemiology, and Mr. DeLorenze is a Research Associate and doctoral student in Epidemiology.

Tearsheet requests to Dr. Satariano,
Division of Public Health Biology and
Epidemiology, School of Public Health, 140
Earl Warren Hall, University of
California at Berkeley, Berkeley, CA
94720; tel. 510-642-6641; fax 510-643-
5163; e-mail <bills@psi.berkeley.edu>.

The Likelihood of Returning to Work After Breast Cancer

SYNOPSIS

Objective. This is an examination of factors associated with returning to work after the diagnosis of breast cancer.

Methods. Three months after being diagnosed with breast cancer, 296 employed women from the Detroit metropolitan area (52 black and 244 white women) were interviewed. These women were part of a larger cohort of 1,011 breast cancer patients ages 40 to 84 interviewed for the study "Health and Functioning in Women with Breast Cancer."

Results. Although most employed women returned to work within three months of the diagnosis of breast cancer, black women were twice as likely as white women to be on medical leave three months after diagnosis (OR = 1.94; 95% CI 1.04 to 3.62). Being on leave was found to be associated with the need for assistance with transportation, limitations in upper-body strength, and employment in jobs requiring physical activity. After adjusting for these factors, the racial difference was reduced and no longer statistically significant (OR = 1.34; 95% CI 0.67, 2.70).

Conclusion. Breast cancer rehabilitation programs should not only address the patient's physical capacity but also the daily demands she is likely to face once she leaves the hospital and returns to work.

Although there is a substantial and growing body of research addressing the quality of life following breast cancer, relatively little information is available about the effects of the disease on women's employment, and, to our knowledge, no research has been conducted on whether there are racial differences in the likelihood of returning to work.¹⁻⁴

Research on cancer patients in general suggests that the likelihood of returning to work is associated with (a) the severity of the disease at diagnosis, (b) the characteristics of the job, and (c) a variety of sociodemographic factors.⁵ In particular, cancer patients diagnosed with advanced disease are more likely to experience problems returning to work than those diagnosed with localized disease.⁶⁻⁸ Employment difficulties are also experienced by those working in blue-collar occupations and low-income or seasonal jobs. One study indicates that manual and clerical employees at American Telephone and Telegraph were

out approximately 60 days longer than management employees, suggesting that workers are not able to return to physically demanding jobs as quickly as to occupations characterized by less physical exertion and more flexible schedules.⁹ The research on cancer patients is consistent with the more extensive literature on returning to work for women after an acute myocardial infarction or coronary bypass surgery.¹⁰⁻¹⁵

We hypothesized that employed black women will be more likely than employed white women to be on medical leave from work in the months following the diagnosis of breast cancer. Previous research has shown that black women are more likely to be diagnosed with advanced disease¹⁶ and to be employed in more physically demanding occupations,¹⁷ factors that may affect the timing of returning to work.

Research in this area should contribute to our understanding of the effects of breast cancer on daily activities and employment. That information, in turn, should prove to be useful for developing more effective breast cancer rehabilitation programs.^{1,2}

Methods

The information reported here is from the study "Health and Functioning in Women with Breast Cancer," which was designed to provide a picture of the health, functional, and psychosocial status of women following the diagnosis and treatment of the disease.¹⁸

Case Ascertainment. Women ages 40 to 84, newly diagnosed with microscopically confirmed, invasive breast cancer, were identified through the Metropolitan Detroit Cancer Surveillance System (MDCSS). The MDCSS, a member of the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program, is a population-based cancer surveillance system that encompasses the Detroit metropolitan area, which has approximately four million residents (Wayne, Oakland, and Macomb counties).

Case ascertainment for the study used the established MDCSS rapid reporting system, which allows identification of cases within four weeks of diagnosis. Cases ascertained through rapid reporting were matched to MDCSS files to determine whether any of the women had a history of breast cancer. Because we are focusing on functional status among women with a first diagnosis of breast cancer, women with a previous diagnosis were not included in this study.

Interview. For the "Health and Functioning in Women with Breast Cancer" study, a total of 1011 women were identified through MDCSS and interviewed by a team of trained interviewers approximately three months after diagnosis in two case series. In the first case series, we identified 571 women ages 55 to 84 over a seven-month period between 1984 and 1985. Of these women, 463 (81.1%) were

successfully interviewed between two and four months after diagnosis. In the second series, 620 eligible women ages 40 to 54 and 75 to 84 were identified over a seven-month period between 1987 and 1988. Of these women, 548 (88.4%) were interviewed, again two to four months after diagnosis. Of the 1011 women, 999 identified themselves as either white or black. Of this 999, 300 were employed at time of diagnosis and 296 were still employed at the time of the interviews. Respondents reviewed and signed informed consent forms prior to the interviews.

Questionnaire. The questionnaire, requiring 45 to 60 minutes to complete, included questions on demographic, social, and functional status. Ninety-five percent of interviews were conducted in the subjects' homes; 5% were administered by telephone.

Several questions addressed current employment status. These questions included whether the subject was currently employed; her regular and most recent job; number of hours normally worked per week; the subject's assessment of the level of physical activity required for her job ("a lot," "some," or "hardly any"); and whether she was currently on leave from work. Leave status is the primary outcome measure for the study.

Other key variables obtained from the interview include the following:

(a) Upper-body limitation: self report of difficulty in heavy and light lifting (over and under 10 pounds). A woman was considered "limited" in a particular area if she reported that the task was either completed with "a lot" of difficulty or was not done because of doctor's orders. Upper-body limitation was coded as a three-level variable: none; moderate (limited in heavy lifting only); severe (limited in both heavy and light lifting).

(b) Age at diagnosis: 40 to 54; 55 to 64; 65 to 84.

(c) Race: self report of ethnicity (black or white only).

(d) Education: self report of total number of years of education (0 to 8; 9 to 11; 12; 13 or more).

(e) Financial resources: self report of whether financial resources have been adequate to meet daily needs.

(f) Body mass: self report of current height and weight, calculated as a body mass index (kg/m^2) (less than 21.00; 21.00 to 27.29; 27.30 to 32.29; more than 32.29).

(g) Self report of a series of symptoms and whether they limit daily activities: depression, fatigue, nausea, chest pain, and back pain.

(h) Marital status and employment status of husband: not married; husband employed; husband retired; husband unemployed.

(i) Transportation: self report of whether needing help with getting to places beyond walking distance.

Cancer stage and treatment. Cancer stage was derived from the MDCSS and was coded as a three-level variable (local, regional, and remote) according to criteria established by the National Cancer Institute's SEER program.¹⁹

Although this is a relatively simple staging scheme, it has clear prognostic significance. Results from the SEER program indicate that the five-year relative survival rate is 92% for women with local breast cancer, 71% for women with regional breast cancer, and 18% for women with remote breast cancer.²⁰

The MDCSS also served as the main source of data on cancer treatment. From MDCSS files, we obtained information on type of surgery (no surgery; partial mastectomy; modified radical mastectomy) and type of adjuvant therapy (radiation and/or chemotherapy). In addition to information routinely collected by the MDCSS, we contacted each physician of record in a special survey to obtain the most complete treatment record for each patient, especially chemotherapy and hormonal therapies received on an outpatient basis. Treatment information from the MDCSS and the special survey was combined to create a five-level treatment variable (no surgery; partial mastectomy only; partial mastectomy with adjuvant therapy; modified radical only; modified radical with adjuvant therapy).

Comorbidity. Abstractors from the MDCSS reviewed the medical records of all cancer patients in the study to code concurrent health conditions on a special abstract form developed for that purpose.²¹ All medical records were reviewed for all hospitalizations. The records included the face sheet, the history and physical examination, and the discharge summary. Two senior staff members (field administrators with more than ten years of abstracting experience) reabstracted the records and compared them with those originally prepared by the medical abstractors. Inconsistencies, found in fewer than 5% of the cases, were reviewed and jointly resolved by senior staff and the abstractor.

The abstractors coded the presence or absence of 18 different comorbid conditions. These conditions were: arthritis, broken bones/skeletal disorders, cancer (other than breast), circulatory conditions, diabetes, ear conditions, eye conditions, gallbladder condition, gastrointestinal condition, heart disease (other than previous myocardial infarction), high blood pressure, kidney condition, liver condition, myocardial infarction, respiratory condition, stroke, thyroid condition, and urinary condition. We latter summarized these conditions as a four-level comorbidity index (0, 1, 2, 3+ comorbid conditions).

Statistical analysis. The analysis was conducted in several steps. First, we examined the association between employment status and race for women in the three age groups. Second, we assessed the association between the medical leave status of those currently employed and a series of factors, including demographic, clinical, social, and behavioral factors. Third, we calculated a number of logistic models, each designed to predict return to work at three months after diagnosis. The base model reported the odds of returning to work for whites compared to blacks, adjusting for age. To that model, we systematically added a series of variables to determine whether the effects of race were changed. The candidate variables for inclusion were those shown in previous bivariate analysis to be associated with return to work at the $P < 0.07$ level of significance. The second model reported the odds by race, education, and financial adequacy. The third model included information about stage of disease and treatment. The final model represented the most parsimonious set of variables for predicting return to work.

Results

Three hundred women were employed at the time of diagnosis. Between diagnosis and the date of the interview, three women retired and one woman became unemployed. Of the remaining 296 women, 212 had returned to work, and 84 were on medical leave at the time they were interviewed. Overall, we found no significant difference between black and white women in employment status. In each of three age groups, the percent not employed for black and white women was strikingly similar both at the time of diagnosis and three months later. The results of the interviews found those not employed as follows: among women ages 40 to 54, 35.3% of white women and 34% of black women; among women ages 55 to 64, 63.7% of white women and 66.7% of black women; among women ages 65 to 84, 96.6% and 93.3%.

At the time of their interviews, 27.0% of women ages 40-54, 30.3% of women ages 55-64, and 31.8% of women ages 65-84 were on medical leave. We found no association between the likelihood of being on medical leave and age; however, 40.4% (21/52) of the black women reported being on medical leave, in contrast to 25.8% (63/244) of the white women ($\chi^2=4.47, p=0.03$). (table 1.)

Table 1. Medical leave status of employed women with breast cancer at 3 months after diagnosis, Detroit metropolitan area, 1984-1987

Race	Medical Leave		Returned to work		Total	
	Number	Percent	Number	Percent	Number	Percent
	N = 84		N = 212		N = 296	
Black.....	21	40.4	31	59.6	52	100.0
White.....	63	25.8	181	74.2	244	100.0

$\chi^2 = 4.47 P = 0.03$

Table 2. Medical leave status by social, clinical, and health factors for 296 employed women with breast cancer at 3 months after diagnosis, Detroit metropolitan area, 1984-87

Variable	Medical Leave		Returned to work		Total	
	Number	Percent	Number	Percent	Number	Percent
	N = 84		N = 212		N = 296	
Stage ^a $\chi^2 = 6.02 P = .05$						
Local	38	23.6	123	76.4	161	100.0
Regional	37	31.4	81	68.6	118	100.0
Remote	8	50.0	8	50.0	16	100.0
Education— $\chi^2 = 7.0 P = 0.07$						
0-8 years	3	33.3	6	66.7	9	100.0
9-11 years	19	45.2	23	54.8	42	100.0
12 years	26	24.5	80	75.5	105	100.0
13+ years	37	26.4	103	73.6	140	100.0
Physical Activity on Job— $\chi^2 = 5.7 P = 0.06$						
A lot	35	33.0	71	67.0	106	100.0
Some	34	31.5	74	68.5	108	100.0
Very Little	5	18.3	67	81.7	82	100.0
Fatigue— $\chi^2 = 10.2 P = 0.01$						
No	34	22.7	116	77.3	150	100.0
Yes, without limitations	16	24.6	49	75.4	65	100.0
Yes, with limitations	34	42.0	47	58.0	81	100.0
Chest Soreness & Pain— $\chi^2 = 8.2 P = 0.02$						
No	52	24.2	163	75.8	215	100.0
Yes, without limitations	22	36.1	39	63.9	61	100.0
Yes, with limitations	10	50.0	10	50.0	20	100.0
Leg Cramps— $\chi^2 = 10.0 P = 0.01$						
No	69	28.9	170	71.1	239	100.0
Yes, without limitations	6	14.6	35	85.4	41	100.0
Yes, with limitations	9	56.3	7	43.7	16	100.0
Ankle Pain ^b — $\chi^2 = 9.2 P = 0.01$						
No	67	27.8	174	72.2	239	100.0
Yes, without limitations	11	23.4	36	76.6	47	100.0
Yes, with limitations	6	75.0	2	25.0	8	100.0
Joint Pain— $\chi^2 = 7.1 P = 0.03$						
No	57	31.0	127	69.0	184	100.0
Yes, without limitations	12	16.7	60	83.3	72	100.0
Yes, with limitations	15	37.5	25	62.5	40	100.0
Limitations in Upper-Body Strength ^a — $\chi^2 = 22.5 P = 0.001$						
None	35	19.2	147	80.8	182	100.0
Moderate (limitation in heavy lift only)	28	38.4	45	61.6	73	100.0
Severe (limitation in heavy & light lift)	21	52.5	19	47.5	40	100.0
Need For Assistance with Transportation— $\chi^2 = 29.1 P=0.001$						
No	61	23.3	201	76.7	262	100.0
Yes	23	67.6	11	32.4	34	100.0

*N=295

^bN=294

To investigate the reasons for this racial difference, we first examined the association between being on medical leave and a series of clinical, social, and health factors. Only those associations found to be statistically significant at the $P \leq 0.07$ are presented in table 2.

We first examined the association between being on leave and breast cancer stage, treatment, comorbidity, and body mass. Women diagnosed with regional and remote stage disease were more likely than women diagnosed with localized disease to be on leave three months after diagnosis ($P=0.05$). Leave status was not associated with the type of treatment, body mass, or the number of concurrent health conditions.

Those with 12 or more years of education were somewhat less likely to be on medical leave than those with less than 12 years of education ($P=0.07$). However, being on leave was not associated with level of financial adequacy, marital status, or, for married women, husband's employment status.

Overall, there was no association between being on leave at three months post-diagnosis and the number of hours worked per week. Although there was some tendency for being on leave to be associated with occupational title, in particular, blue-collar occupations, the association was not statistically significant ($P=0.09$). We did find, however, that women who reported that their jobs required either "a lot" or "some" physical activity were somewhat less likely to return to work than women who reported that their jobs required "very little" physical activity ($P=0.06$) (table 2).

In the bivariate analysis, women on leave were more likely than those who returned to work to experience general fatigue, pain or soreness in the chest area, leg cramps, as well as ankle and general joint pain. They were also more likely to experience limitations in upper-body strength and to report a need for assistance with transportation, by having someone either drive a car or assist them with public transportation. On the other hand, there was no difference between the two groups in reports of depression, nausea, and back pain (table 2).

Table 3 reports the results of logistic analyses designed to identify those factors that (a) were independently associated with being on medical leave and (b) helped to explain the black/white difference. Adjusting for age, black women were shown to be nearly twice as likely as white women to be on leave from work three months after diagnosis (OR=1.94; 95% CI 1.04 to 3.62). Table 3 also reports the most parsimonious model, based on 295 cases for whom complete information was available on all variables included in the model. Three factors were significantly associated with being on leave from work three months after diagnosis: (a) need for assistance with transportation; (b) limitations in upper-body strength; (c) employment in jobs requiring at least some physical activity. After adjusting for these factors, the racial difference was reduced and no longer statistically significant.

Discussion

Returning to work after breast cancer was affected by the patient's functional status as well as her need for assistance with transportation and the physical demands of her job. These results were consistent with the view expressed by Verbrugge and Jette that "disablement" results from a process in which daily demands exceed the individual's functional capacity to satisfy those demands.²²

These findings, consistent with other studies of returning to work after hospitalization, seemed to explain in part why black women were less likely than white women to return to work three months after diagnosis.^{5,6,9,23,24} Black/white differences in returning to work seem to be due, at least in part, to differences in reduced upper-body strength as well as differences in the demands of everyday life.

In the unadjusted analysis, stage of disease was associated with being on leave. In the final model, however, it was no longer associated with the outcome, perhaps because limitations in upper-body strength accounted for the association between breast cancer stage and leave status.

It is surprising that returning to work was not associated with the presence of concurrent health conditions, increasing age, or marital status, as has been reported in studies of heart disease.^{14,15} While it may be that employment is affected differently by breast cancer than it is by heart disease or bypass surgery, the significance of comorbidity, age,

Table 3. Factors associated with medical leave status in 295 employed women with breast cancer, 3 months after diagnosis, Detroit metropolitan area, 1984-1987

	Odds Ratio	95% CI
Race		
Black vs. white	1.94	1.04, 3.62
Age		
55-64 years vs. 40-54 years	1.17	0.67, 2.05
65-84 years vs. 40-54 years	1.21	0.46, 3.18
Most parsimonious model		
Race		
Black vs. white	1.34	0.67, 2.70
Age		
55-64 years vs. 40-54 years	0.82	0.44, 1.54
65-84 years vs. 40-54 years	0.86	0.29, 2.60
Upper-body strength limitations		
moderate vs. none	2.45	1.30, 4.64
severe vs. none	2.66	1.13, 6.31
Physical activity on job		
some vs. none	2.09	0.99, 4.42
a lot vs. none	2.51	1.18, 5.32
Need transportation assistance		
yes vs. no	4.76	1.96, 11.66

and marital status need to be examined in greater detail.

Future studies should include larger numbers of employed women to address in particular how returning to work might vary by the characteristics and physical demands of specific occupations. With a larger sample size, it would also be possible to determine how the exact time interval between the date of diagnosis and the date of return varies by race, age, and other factors. The terms of medical leave should also be examined, for example, to establish the extent to which a woman is paid or receives other benefits while on leave. In addition, it is important to determine to what extent and in what ways breast cancer affects the ease with which a woman can drive a car or use mass transit and, in turn, how this factor affects returning to work.

Racial and socioeconomic differences should be examined in greater detail. We need to learn whether black women employed in physically demanding jobs experience particular economic and social costs because of their delayed return, such as lost wages or strains experienced by their families. This would include an examination of the family supports available to black and white women. We also need to consider whether as a group black women are more likely to have jobs that are less attractive and, as a result, have less incentive to return to work. Finally, we should determine whether job expectations vary by occupational title for women returning to work. Do those who return sooner tend to be employed in positions in which expectations are not only less physically demanding but more flexible and accommodating? This means understanding more clearly what returning to work actually entails and how it may vary by occupational title.

In conclusion, these results provide convincing evidence that comprehensive rehabilitation programs are in order, particularly those that address the needs of women working in physically demanding jobs and those in need of transportation assistance.

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References

1. Baquet CR, Ringen K, Heinomen JA et al., editors. *Annotated Bibliography of Cancer-Related Literature on Black Americans*. Washington, DC: National Institutes of Health 1988 (NIH Pub. No. 89-3024).
2. Freeman HP, Wasfie TJ. Cancer of the breast in poor black women. *Cancer* 1989;63:2562-2569.
3. Ganz PA. Quality of life and the patient with cancer. *Cancer* 1994;74:1445-1452.
4. Ganz PA, Coscarelli Schag CA, Cheng H-L. Assessing the quality of life—a study in newly-diagnosed breast cancer patients. *J Clin Epidemiol* 1990;43:75-86.
5. Barofsky I. Maximizing the productive activities of the cancer patient: research issues. In Barofsky I, editor. *Work and Illness: The Cancer Patient*. New York: Praeger, 1989;135-158.
6. Feldman FL. *Work and cancer health histories: A study of the experiences of recovered blue-collar workers*. Oakland: California Division, American Cancer Society, 1978.
7. Ganz PA, Coscarelli Schag C, Heinrich RL. Information about work from studies with the cancer inventory of problem situations (CIPS). In Barofsky I, editor. *Work and Illness: The Cancer Patient*. New York: Praeger, 1989;117-132.
8. Cookfaire DL, Mettlin C, Cummings KM, Lane W. Quality of life among cancer patients. In Engstrom, Anderson PN, Mortenson LE, editors. *Advances in Cancer Control: Research and Development*. New York: Alan R. Liss, Inc., 1983.
9. Watson SD. *Saving money and helping people: A multi-method analysis of the employed experiences of cancer survivors*. Washington DC: Washington Business Group on Health/Institute for Rehabilitation and Disability Management, 1990.
10. Shanfield SB. Return to work after an acute myocardial infarction: A review. *Heart & Lung* 1990;19:109-117.
11. Zysanski SJ, Rouse BA, Stanton BA, Jenkins CD. Employment changes among patients following coronary bypass surgery: social, medical, and psychological correlates. *Pub Health Rep* 1982; 97:558-565.
12. Chirikos TN, Nickel JL. Work disability from coronary heart disease in women. *Women & Health* 1984;9:55-74.
13. Cochrane BL. Acute myocardial infarction in women. *Crit Care Nursing Clinics of No. America* 1992;4:279-289.
14. Wenger NK. Coronary disease in women. *Ann Rev Med* 1985; 36:285-294.
15. Hamilton GA. Recovery from acute myocardial infarction in women. *Cardiology* 1990;77(suppl 2):58-70.
16. Satariano WA, Belle SH, Swanson GM. The severity of breast cancer at diagnosis: a comparison of age and the extent of disease in black and white women. *Am J Pub Health* 1986;76:779-782.
17. Zalokar N. *The economic status of black women: an exploratory investigation*. Washington DC: U.S. Commission on Civil Rights, 1990.
18. Satariano WA, Ragheb NE, Branch LG, Swanson GM. Difficulties in physical functioning reported by middle-aged and elderly women with breast cancer: A case-control comparison. *J Geront:Med Sci* 1990;45:M3-M11.
19. Shambaugh EM, Weiss MA, Axtell LM, editors. *Summary Stage Guide Cancer Surveillance, Epidemiology and End Results Reporting (SEER) Program*. Washington, DC: National Cancer Institute, 1977.
20. Ries LA, Hankey BF, Edwards BK. *Cancer Statistics Review 1973-87 (NIH Publication No. 90-2789)*. Bethesda, MD: National Cancer Institute, 1990.
21. Satariano WA, Ragland DR. The effects of comorbidity on 3-year survival for women with primary breast cancer. *Ann Intern Med* 1994;120:104-110.
22. Verbrugge L, Jette A. The disablement process. *Soc Sci Med* 1994;38:1-14.
23. Chirikos TN, Nestel G. Economic determinants and consequences of self-reported work disability. *J Health Econ* 1984;3:117-136.
24. Chirikos TN, Nickel JT. Socioeconomic determinants of continuing functional disablement from chronic disease episodes. *Soc Sci Med* 1986;22:1329-1335.